Water as a Universal Solvent

Written by:
Cathy Collins – Weston Middle School – CathleenCollins@westonk12-ct.org
Mary Connolly – Wintergreen Magnet School – mconnolly@aces.org , or wconn56@comcast.net
Pamela Harmon – The Foote School , New Haven – Pamela_harmon@antiochne.edu

CT. Content Standard GLE 6.4.3 C11:

Water moving across and through earth materials carries with it the products of human activities.

Water is a universal solvent. Explain how human activity may impact water resources in Connecticut, such as ponds, rivers and the Long Island Sound ecosystem.

Materials list (possible):
Must reserve microscopes for first day and/or second.
Magnifying glasses second day.
Salt – cooking
Road (Rock) Salt
Water (hot cold room temp.)
Sand
Fruit Drink Mix
Pepper
Baking soda
Flour
Miracle Grow Crystals
Sugar
Twigs
Leaves
Iron Filings
Oil
Food Coloring
Vinegar
Thermometers
Spoons
Beakers
Balances
Graduated cylinders

Inquiry Starters:

Two Stations with task cards:

1. Microscope experience with salt and water. Students place a few grains of salt on a slide. Then observe as the water is added to the NaCl (salt). added.
2. Microscope experience with salt and oil. Students place a few grains of salt on a slide. They observe as the oil is added to the NaCl (salt).

Best done in pairs.

Thinking Tools:

• Picture of NaCl being dissolved by H20 on the atomic level.

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Water as a Universal Solvent Con…

Inquiry Starters Think Tools con…:

• Show kids thermometer.

I Observe and I Wonder Sharing.

Questions related to.

Goal questions:

Why does salt disappear in water and not oil? (correct if say "melt")
If my water or oil were hot, what would happen?
What happens to salt in cold water or cold oil?
Will everything dissolve in water?
Will anything dissolve in oil?
Why don't I dissolve in water?
How much salt can I add to the water and see it still dissolve?
Etc. …….

Post Questions. Ask students to choose the three questions, which interest them the most.

Home work: Choose one:

Why is water special?
When do we consider water to be polluted?
Does the fact ocean water contains more salt then fresh water mean that it is polluted?
Why do we filter drinking water?

End of first period.

Overnight: Teacher selects pairs of student partners.

Day 2:

Notebooks:

Names of lab partners, question, material they intend to use, investigation's first step. Have kids get the teacher's ok. Remind them to make many observations, drawings, collect data….

Introduce materials to kids.

Focused Investigation

Kids will test various substances in water and oil to test for solvency.

Process Skills:

Observation, Questioning, Hypothesizing, Predicting, Planning and Investigating, Interpreting and Communicating.

Shared Understanding

Teacher introduces and reinforces vocabulary during facilitated discussion.
Student pairs will pair up (for a total of 4 students) to discuss their findings and results. Students discussion groups will then choose one finding to present to the entire class at a time. Popcorn around the class until ideas are exhausted. Students are encouraged to continue to write new questions and findings in their journals.

Clean up.

Journal Reflection: What did you learn; what do you wonder?

Homework: What would the world be like if all the water in the world was vegetable oil?

Assessment:

Teacher Provides (choose most important components): A picture of a river valley that includes a farm w/ fertilizer being applied, a road, a factory, a healthy riparian area, no riparian area, a golf course, a swimming area, a neighborhood, a natural wooded area, a cattle/poultry farm.

Student Prompt: Based on what you have learned about water explain, using your new vocabulary and understand, how human activity might effect the river in this valley. Use at least three pieces of evidence from your experiments and our classroom sharing to justify your answers. You are encouraged to include diagrams with your explanations.